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PATENT SPECIFICATION

767,401

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COMPLETE SPECIFICATION

Improvements in or relating to an Adjustable Wrench

I, [DR.] EUGEN MAYER, a German National, of Am Kriegsbergturm 51, Stuttgart/Württemburg, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to an adjustable wrench comprising a wrench head which carries the fixed jaw and in which the movable jaw is linearly guided so that it can be adjusted in its position by a hand lever pivotally mounted within the wrench head. It has been proposed in the past to keep the movable jaw continuously in its closed position by the action of a spring, which has the disadvantage that this jaw has to be opened or moved backwards, always against the action of the spring, if a workpiece, a nut or the head of a bolt have to be gripped.

It is the object of the present invention to obtain an adjustable wrench which can be used in a simple and convenient manner for several succeeding sizes of the workpiece, i.e., sizes of jaw.

According to the present invention there is provided an adjustable wrench comprising a head which carries a jaw which is fixed in relation thereto and a jaw which is movable in relation thereto by means of a manually operable lever, pivoted in the wrench head, the movable jaw having a guide tongue extending longitudinally into the wrench head, and wherein a part of the wrench is arranged to be subjected to spring actions which operate in opposed directions so that longitudinally opposed spring loads are exerted on the guide tongue. As a result of the longitudinally opposed, i.e., two-sided, spring loading, the movable jaw tends to move automatically into a central position, so that workpieces which correspond to this position, i.e., to this span of jaw, or which require a smaller span of jaw, can be easily gripped and tightened by a movement of the hand operable lever. A backward movement of the movable jaw against the action of the spring is only necessary if a workpiece has to be gripped which requires a larger span of jaw.

A worm may be rotatably mounted within the wrench head for adjusting the jaw span, said worm being axially displaceable by the manually operable lever through a shifting sleeve slidable on the shaft of the worm, said worm and shifting sleeve lying between compression springs located in the wrench head. The range of movement of the worm in an axial direction may have such a magnitude that by a single adjustment of the movable jaw the wrench can be applied at least to two succeeding sizes of work piece.

There may be provided a locking lever which is pivotally mounted in one of said jaws and spring loaded at both lateral sides thereof and which has a locking pin to engage a rack cut into the guide tongue. The range of movement within which the locking lever can be adjusted may be limited by stops.

The pivotal axis of the locking lever may be situated laterally displaced in respect of the longitudinal axis of the locking pin. The carrier of the locking bolt, which is movably mounted within the head of the wrench, may be then spring-loaded in such a manner that, if the tightening force applied to the hand lever is removed, the span of jaw is automatically regained to which it had been adjusted before the tightening operation. This adjustment of the span of jaw by means of a locking bolt and notches will always be such that a certain play remains between the jaws and the surfaces of the workpiece. If the hand lever is turned in a direction opposite to that of the tightening rotation, then the edges of the work piece or of the bolt head effect a resilient opening of the jaw.

[Price 3/-]

Such an opening of the jaws facilitates considerably the renewed gripping with the wrench (for instance, after the workpiece has been turned 60° and the wrench has been turned back 60° in order to grip the workpiece again) in view of the fact that the spanner may remain in touch with the workpiece. When the jaws are released, also in this case the originally-adjusted size of jaw returns automatically. The distance between notches cut into the guide tongue may be such that it corresponds preferably to the conventional sizes of jaw of the workpiece, e.g., of the nuts or the heads of bolts, including the additional play.

Any of said spring actions may be provided by a resilient mass, e.g., rubber or the like.

A leaf spring may be fixed in the jaw which is fixed in relation to the head and adapted to engage a rack cut into the guide tongue which is thereby subjected to spring actions in opposed directions in dependence upon the direction of displacement of the guide tongue from its normal position.

Reference is now made to the accompanying drawings which illustrate embodiments of the present invention here given by way of example:—

In the accompanying drawings Fig. 1 shows a front view of a wrench according to the invention; Fig. 2 is a corresponding side view; and Figs. 3 and 4 show the wrench according to Figs. 1 and 2 in a central section when gripping workpieces with different sizes of jaw.

Fig. 5 illustrates a central section of another construction of the wrench, the adjustable members being represented in their rest position; whilst Figs. 6 and 7 correspond to Fig. 5, but show the movable parts in different positions.

Figs. 8 and 9 represent a front view and side view of a third example of a wrench according to the invention, and Figs. 10, 11 and 12 show part of the wrench according to Figs. 8 and 9 on an enlarged scale, the head of the wrench being represented in section and its parts in different positions.

Fig. 13 illustrates a side view, partly in section, of a fourth example of a wrench according to the invention.

Corresponding parts of the individual embodiments of the invention to be described hereinafter are designated by the same reference numerals.

Within head 1 of wrench, which at the same time forms the fixed jaw 2, a movable jaw 3 is guided so that it can be shifted; to this end a guide tongue 3' of the jaw 3 extends into a guide way 4 of the wrench head 1. Within the guide way 4, which has preferably a cylindrical cross-section, cylindrical spiral springs 5, 6 are disposed at both sides of the guide tongue 3'. The spring 6 is supported by the end face of the guide way 4, whilst the spiral spring 5 bears against a screw 7 screwed into the bore of the guide way 4. The tongue 3' of the movable jaw 3 is provided with a tooth 3'' which engages the bifurcated end 8' of wrench lever 8, which is pivotally mounted about a pin 9 in the head of the wrench.

The central position of the movable jaw and of the wrench lever is represented in Fig. 1 with full lines. Two possible limit positions of both parts 3, 8 are indicated by dot-dash lines.

It clearly appears from Figs. 3 and 4 that workpieces 10, 10' requiring different spans of jaw, which may be nuts or the heads of bolts, can be tightened. Between the two spans of jaw, shown in Figs. 3 and 4, lies at least one other of the conventional spans of jaw, so that the wrench is adapted to be used optionally at least for three successive sizes of the conventional spans of jaw.

If the operator releases the pressure exerted by his hands upon the wrench lever 8, then automatically an increase of the span of jaw occurs due to the action of the spiral spring compressed at that time, so that the workpiece 10 can be easily gripped again for its continued rotation.

With the construction shown in Figs. 5 to 7, a worm 12 is rotatably and shiftably mounted on a shaft 11 supported in the head 1 of the wrench, which worm engages, in a manner known *per se*, a rack 13 cut into the guiding tongue 3' of the movable jaw 3. The shaft 11 of the worm is screwed in at its right end in a screw-threaded bore 14 of the wrench head, whilst its left end rests within a nut 15 screwed into the wrench head from outside. Adjacent to the worm 12 a shifting sleeve 16 is slidably mounted on the shaft 11, and this sleeve is engaged by a tooth 17 of the hand lever 8 pivotally supported about a pin 9. Naturally, the inverse arrangement of the co-acting members 16, 17 can be provided, similar to that according to the construction shown in Figs. 1 to 4. The worm 12 and the adjacent shifting sleeve 16 are disposed between two spiral pressure springs 5 and 6 which are arranged around the worm shaft 11 and the outer ends of which are supported by the wrench head and by the nut 15 respectively. The two springs 5 and 6 hold the worm 12 and the sleeve 16 and with them also the hand lever 8 in a spring-loaded pendulous rest position, as shown in Fig. 5. By rotating the worm 12, which is accessible in a manner known *per se* from outside through a cut-out 18 in the head 1 of the wrench, the jaw 3 can be displaced and adjusted to a certain span of jaw or size of jaw of the nut to be tightened. Only an approximate adjustment is required, so that a small play remains between the jaws 2, 3 and the nut 10, as shown in Fig. 5. This

play facilitates the repeated gripping of the nut 10 by the wrench. The gripping of the nut 10 is effected by a small angular movement of the hand lever 8 in a clockwise direction, whereby the movable members 12, 16, 3 are shifted to the right and the spring 6 is compressed to a certain extent (see Fig. 6). In this clamped position the nut 10 can be rotated. If the hand lever 8 is released then, due to the pressure exerted by the spring 6, all members return into the position shown in Fig. 5, so that it is easily possible to remove the wrench laterally from the nut and to slip it over the nut again in a new position.

However, these repeated lateral movements of the spanner with respect to the nut 10 are not necessary; if the hand lever 8 and with it the head of the wrench are angularly displaced in an anti-clockwise direction, then the adjustable members 12, 16, 3 move to the left, compressing thereby the spring 5, so that the span of the jaw becomes so large that the nut can lie edgewise between the jaws 2, 3, as shown in Fig. 7. If now the spanner is turned further in a clockwise direction around the nut 10, then the members regain, by the action of the spiral spring 5, automatically the position shown in Fig. 5. By a rotation in a clockwise direction the nut 10 is gripped again and can be further tightened.

The lateral play, i.e., the possibility of shifting the worm 12 and the sleeve 16 within the head of the wrench in an axial direction, may be chosen such that, for instance, workpieces 10 corresponding to three succeeding sizes of jaw can be operated upon with only one adjustment of the span of jaw by rotation of the worm 12.

With the construction shown in Figs. 8 to 12, the hand lever 8, which is again pivotally mounted about a pin 9 within the head 1 of the wrench, is provided with a head 19 which engages the guide tongue 3'. The lever head 19 may be given the shape of a circular disc which engages a corresponding cut-out 20 in the guide tongue 3'.

In contrast to the examples hereinbefore described, a lever 22 is pivotally mounted about a pin 23 within a cut-out 21 of the wrench head or the jaw 2. A locking pin 25, which is under the action of a pressure spring 24, is slidably arranged within the said lever 22.

In the illustrated example the locking lever 22 is disposed between two compressed spiral springs 26, 27 the outer ends of which are supported by the body of the wrench head. Both springs 26 and 27 bear against small grub screws 28, 29 which are screwed into screw-threaded bores in the wrench head or in a sleeve 30 screwed into the said head. The tension of the springs 26, 27 can be controlled or adjusted by means of the grub screws 28, 29 in such a manner that the locking lever 22 is equally loaded in its rest position shown in Fig. 10. The sleeve 30 on the one hand and the face 21' of the cut-out 21 in the jaw on the other hand form stops which limit the pendulous movement of the locking lever 22 at both sides. The locking pin 25 co-acts with a number of notches 31 or with a rack cut into the guide tongue 3' of the adjustable jaw 3.

If a workpiece, for instance, the hexagon head 10 of a bolt represented in the drawing has to be tightened, then the jaw 3 of the wrench is brought into contact with one face of the head 10 of the bolt without regard to the existing span of jaw. If now the hand lever 8 is shifted from the position represented in Fig. 8 with full lines into the position shown in dashed lines, then the head 1 of the wrench and with it the jaw 2 move in the direction towards the jaw 3 until the jaw 2 bears against the head 10 of the bolt as shown in Fig. 11. If the hand lever 8 is moved further in the same direction, then a rotation of the screw head 10 is effected as far as the spacial conditions permit. With this closing movement of the jaws the locking lever 22 moves from its rest position, shown in Fig. 10, into the position according to Fig. 11, whereby the compression of the spiral spring 26 is increased. If at the start of operation the wrench has a larger size of jaw than shown in Fig. 10, then the locking pin 25 moves from one notch into the next following one 31, until the position shown in Fig. 11 is reached. The size of the screw head 10, shown in Figs. 10 to 12, is the smallest in respect of the wrench in question, in view of the fact that the locking pin 25 engaged already the last or innermost notch 31, as shown in Fig. 11. If a larger head of a bolt should be operated upon, then the locking pin would engage a notch 31 situated further outwards compared with the position shown in Fig. 11.

If the bolt head 10 has been partly turned and the force applied to the hand lever 8 is relieved, then the compressed spiral spring 26 causes an opening of the jaws to a small extent as shown in Fig. 10, and the locking pin 25 and its lever 22 attain again the rest position shown in Fig. 10. Now, a small play remains between the jaws 2, 3 and the bolt head 10 so that it is easily possible to withdraw the wrench from the bolt head and to engage again the bolt head in a new position. With each succeeding gripping, the small play represented in Fig. 10 immediately disappears as soon as the jaw 3 has been brought into contact with the head of the bolt and the hand lever 8 is turned in the tightening direction.

The repeated gripping by means of the wrench can be also effected in a more simple manner, similar to that described in connec-

Such an opening of the jaws facilitates considerably the renewed gripping with the wrench (for instance, after the workpiece has been turned 60° and the wrench has been turned back 60° in order to grip the workpiece again) in view of the fact that the spanner may remain in touch with the workpiece. When the jaws are released, also in this case the originally adjusted size of jaw returns automatically. The distance between notches cut into the guide tongue may be such that it corresponds preferably to the conventional sizes of jaw of the workpiece, e.g., of the nuts or the heads of bolts, including the additional play.

Any of said spring actions may be provided by a resilient mass, e.g., rubber or the like.

A leaf spring may be fixed in the jaw which is fixed in relation to the head and adapted to engage a rack cut into the guide tongue which is thereby subjected to spring actions in opposed directions in dependence upon the direction of displacement of the guide tongue from its normal position.

Reference is now made to the accompanying drawings which illustrate embodiments of the present invention here given by way of example.

In the accompanying drawings Fig. 1 shows a front view of a wrench according to the invention; Fig. 2 is a corresponding side view; and Figs. 3 and 4 show the wrench according to Figs. 1 and 2 in a central section when gripping workpieces with different sizes of jaw.

Fig. 5 illustrates a central section of another construction of the wrench, the adjustable members being represented in their rest position; whilst Figs. 6 and 7 correspond to Fig. 5, but show the movable parts in different positions.

Figs. 8 and 9 represent a front view and side view of a third example of a wrench according to the invention, and Figs. 10, 11 and 12 show part of the wrench according to Figs. 8 and 9 on an enlarged scale, the head of the wrench being represented in section and its parts in different positions.

Fig. 13 illustrates a side view, partly in section, of a fourth example of a wrench according to the invention.

Corresponding parts of the individual embodiments of the invention to be described hereinafter are designated by the same reference numerals.

Within head 1 of the wrench, which at the same time forms a fixed jaw 2, a movable jaw 3 is guided so that it can be shifted. To this end a guide tongue 3' of the jaw 3 extends into a guide way 4 of the wrench head 1. Within the guide way 4, which has preferably a cylindrical cross-section, cylindrical spiral springs 5, 6 are disposed at both sides of the guide tongue 3'. The spring 6 is supported by the end face of the guide way 4, whilst the spiral spring 5 bears against a screw 7 screwed into the bore of the guide way 4. The tongue 3' of the movable jaw 3 is provided with a tooth 3'' which engages the bifurcated end 8' of wrench lever 8, which is pivotally mounted about a pin 9 in the head of the wrench.

The central position of the movable jaw and of the wrench lever is represented in Fig. 1 with full lines. Two possible limit positions of both parts 3, 8 are indicated by dot-dash lines.

It clearly appears from Figs. 3 and 4 that workpieces 10, 10' requiring different spans of jaw, which may be nuts or the heads of bolts, can be tightened. Between the two spans of jaw, shown in Figs. 3 and 4, lies at least one other of the conventional spans of jaw, so that the wrench is adapted to be used optionally at least for three successive sizes of the conventional spans of jaw.

If the operator releases the pressure exerted by his hands upon the wrench lever 8, then automatically an increase of the span of jaw occurs due to the action of the spiral spring compressed at that time, so that the workpiece 10 can be easily gripped again for its continued rotation.

With the construction shown in Figs. 5 to 7, a worm 12 is rotatably and shiftably mounted on a shaft 11 supported in the head 1 of the wrench, which worm engages, in a manner known *per se*, a rack 13 cut into the guiding tongue 3' of the movable jaw 3. The shaft 11 of the worm is screwed in at its right end in a screw-threaded bore 14 of the wrench head, whilst its left end rests within a nut 15 screwed into the wrench head from outside. Adjacent to the worm 12 a shifting sleeve 16 is slidably mounted on the shaft 11, and this sleeve is engaged by a tooth 17 of the hand lever 8 pivotally supported about a pin 9. Naturally, the inverse arrangement of the co-acting members 16, 17 can be provided, similar to that according to the construction shown in Figs. 1 to 4. The worm 12 and the adjacent shifting sleeve 16 are disposed between two spiral pressure springs 5 and 6 which are arranged around the worm shaft 11 and the outer ends of which are supported by the wrench head and by the nut 15 respectively. The two springs 5 and 6 hold the worm 12 and the sleeve 16 and with them also the hand lever 8 in a spring-loaded pendulous rest position, as shown in Fig. 5. By rotating the worm 12, which is accessible in a manner known *per se* from outside through a cut-out 18 in the head 1 of the wrench, the jaw 3 can be displaced and adjusted to a certain span of jaw or size of jaw of the nut to be tightened. Only an approximate adjustment is required, so that a small play remains between the jaws 2, 3 and the nut 10, as shown in Fig. 5. This

play facilitates the repeated gripping of the nut 10 by the wrench. The gripping of the nut 10 is effected by a small angular movement of the hand lever 8 in a clockwise direction, whereby the movable members 12, 16, 3 are shifted to the right and the spring 6 is compressed to a certain extent (see Fig. 6). In this clamped position the nut 10 can be rotated. If the hand lever 8 is released then, due to the pressure exerted by the spring 6, all members return into the position shown in Fig. 5, so that it is easily possible to remove the wrench laterally from the nut and to slip it over the nut again in a new position.

However, these repeated lateral movements of the spanner with respect to the nut 10 are not necessary; if the hand lever 8 and with it the head of the wrench are angularly displaced in an anti-clockwise direction, then the adjustable members 12, 16, 3 move to the left, compressing thereby the spring 5, so that the span of the jaw becomes so large that the nut can lie edgewise between the jaws 2, 3, as shown in Fig. 7. If now the spanner is turned further in a clockwise direction around the nut 10, then the members regain, by the action of the spiral spring 5, automatically the position shown in Fig. 5. By a rotation in a clockwise direction the nut 10 is gripped again and can be further tightened.

The lateral play, i.e., the possibility of shifting the worm 12 and the sleeve 16 within the head of the wrench in an axial direction, may be chosen such that, for instance, workpieces 10 corresponding to three succeeding sizes of jaw can be operated upon with only one adjustment of the span of jaw by rotation of the worm 12.

With the construction shown in Figs. 8 to 12, the hand lever 8, which is again pivotally mounted about a pin 9 within the head 1 of the wrench, is provided with a head 19 which engages the guide tongue 3'. The lever head 19 may be given the shape of a circular disc which engages a corresponding cut-out 20 in the guide tongue 3'.

In contrast to the examples hereinbefore described, a lever 22 is pivotally mounted about a pin 23 within a cut-out 21 of the wrench head or the jaw 2. A locking pin 25, which is under the action of a pressure spring 24, is slidably arranged within the said lever 22.

In the illustrated example the locking lever 22 is disposed between two compressed spiral springs 26, 27 the outer ends of which are supported by the body of the wrench head. Both springs 26 and 27 bear against small grub screws 28, 29 which are screwed into screw-threaded bores in the wrench head or in a sleeve 30 screwed into the said head. The tension of the springs 26, 27 can be controlled or adjusted by means of the grub screws 28, 29 in such a manner that the locking lever 22 is equally loaded in its rest position shown in Fig. 10. The sleeve 30 on the one hand and the face 21' of the cut-out 21 in the jaw on the other hand form stops which limit the pendulous movement of the locking lever 22 at both sides. The locking pin 25 co-acts with a number of notches 31 or with a rack cut into the guide tongue 3' of the adjustable jaw 3.

If a workpiece, for instance, the hexagon head 10 of a bolt represented in the drawing has to be tightened, then the jaw 3 of the wrench is brought into contact with one face of the head 10 of the bolt without regard to the existing span of jaw. If now the hand lever 8 is shifted from the position represented in Fig. 8 with full lines into the position shown in dashed lines, then the head 1 of the wrench and with it the jaw 2 move in the direction towards the jaw 3 until the jaw 2 bears against the head 10 of the bolt as shown in Fig. 11. If the hand lever 8 is moved further in the same direction, then a rotation of the screw head 10 is effected as far as the spacial conditions permit. With this closing movement of the jaws the locking lever 22 moves from its rest position, shown in Fig. 10, into the position according to Fig. 11, whereby the compression of the spiral spring 26 is increased. If at the start of operation the wrench has a larger size of jaw than shown in Fig. 10, then the locking pin 25 moves from one notch into the next following one 31, until the position shown in Fig. 11 is reached. The size of the screw head 10, shown in Figs. 10 to 12, is the smallest in respect of the wrench in question, in view of the fact that the locking pin 25 engaged already the last or innermost notch 31, as shown in Fig. 11. If a larger head of a bolt should be operated upon, then the locking pin would engage a notch 31 situated further outwards compared with the position shown in Fig. 11.

If the bolt head 10 has been partly turned and the force applied to the hand lever 8 is relieved, then the compressed spiral spring 26 causes an opening of the jaws to a small extent as shown in Fig. 10, and the locking pin 25 and its lever 22 attain again the rest position shown in Fig. 10. Now, a small play remains between the jaws 2, 3 and the bolt head 10 so that it is easily possible to withdraw the wrench from the bolt head and to engage again the bolt head in a new position. With each succeeding gripping, the small play represented in Fig. 10 immediately disappears as soon as the jaw 3 has been brought into contact with the head of the bolt and the hand lever 8 is turned in the tightening direction.

The repeated gripping by means of the wrench can be also effected in a more simple manner, similar to that described in connec-

tion with the example shown in Figs. 5 to 7 by leaving the spanner in its position where it surrounds the bolt head. If the hand lever 8 is rotated in a direction opposite to the tightening direction, i.e., backwards, then first the described small opening of the jaws according to Fig. 10 occurs again. If the spanner is moved further backwards, then the edges of the bolt head 10 engage the jaws 2, 3 so that the latter are opened or moved apart up to the position shown in Fig. 12, where a diagonal of the bolt head comes to lie at right angles with respect to the jaw faces. This opening of the jaws takes place against the action of a spring, because the locking lever 22 is caused to swing into the opposite direction, whereby the spiral spring 27 is further compressed. The locking pin 25 itself remains in the same, previously engaged notch 31 of the guide tongue 3'. If the hand lever 8 is rotated further backwards, i.e., opposite to the tightening direction, then, by means of the pressure exerted by the previously compressed spring 27, a closing movement of the jaws 2, 3 automatically occurs until they attain again the position shown in Fig. 10, whereupon by the following rotation in the tightening direction of the hand lever 8 the gripping of the bolt head 10 by means of the jaws takes place as described before.

The pivotal axis 23 of the locking lever 22 is laterally displaced in respect of the longitudinal axis of the locking pin 25, the displacement being in an inward direction towards the spring 27. This lateral or eccentric position of the pivotal axis 23 has the advantage that a safe engagement between the locking pin 25 and the notches 31 is ensured, in view of the fact that the inward swinging movement of the lever 22 is longer than its outward movement.

The distance between the individual notches 31 corresponds to the conventional sizes of jaw of the bolt heads or nuts so that the described advantageous function takes place in each case independently of the span of jaw of the workpiece.

It will be appreciated that the two described pressure springs which act upon the locking pin carrier may be replaced by another similarly acting spring arrangement, for instance, one side of the locking pin carrier may be subjected to the action of a pressure spring as well as of a tension spring, or a spring may be so arranged that it influences the represented locking lever 22 at a point between this lever and its pivot pin 23. Similarly, instead of the built-in spiral pressure springs or tension springs, also a resilient mass, e.g., rubber or the like, may be used. It will be understood that the notches 31 may also be arranged at distances which differ from the conventional sizes of jaw.

With the further construction represented in Fig. 13, the lever 22 with the locking pin 25 and the springs 24, 26 and 27 are replaced by a leaf spring 22' clamped into the fixed jaw 2, the free end of which engages notches 31. In order to enable the resilient movement of the clamped spring 22' the fixed jaw 2 is provided with a corresponding recess 21''. Due to the leaf spring 22' the guide tongue is subjected to spring actions in opposed directions in dependence upon the direction of displacement of the guide tongue from its normal position.

What I claim is:—

1. An adjustable wrench comprising a head which carries a jaw which is fixed in relation thereto and a jaw which is movable in relation thereto by means of a manually operable lever pivoted in the wrench head, the movable jaw having a guide tongue extending longitudinally into the wrench head, and wherein a part of the wrench is arranged to be subjected to spring actions which operate in opposed directions so that longitudinally opposed spring loads are exerted on the guide tongue.

2. An adjustable wrench according to Claim 1 wherein a worm is rotatably mounted within the wrench head for adjusting the jaw span, said worm being axially displaceable by the manually operable lever through a shifting sleeve slidable on the shaft of the worm, said worm and shifting sleeve lying between compression springs located in the wrench head.

3. An adjustable wrench as claimed in Claim 2 wherein the range of movement of the worm in an axial direction has such a magnitude that by a single adjustment of the movable jaw the wrench can be applied at least to two succeeding sizes of workpiece

4. An adjustable wrench as claimed in Claim 1 wherein a locking lever which is pivotally mounted in one of said jaws and spring loaded at both lateral sides thereof has a locking pin to engage a rack cut into the guide tongue.

5. An adjustable wrench as claimed in Claims 1 and 4 wherein the range of movement within which the locking lever can be adjusted is limited by stops.

6. An adjustable wrench as claimed in Claim 4 or 5 wherein the locking lever is pivotally mounted by a pivot pin which is situated laterally displaced in respect of the longitudinal axis of the locking pin.

7. An adjustable wrench as claimed in any preceding claim wherein any of said spring actions are provided by a resilient mass, e.g., rubber or the like.

8. An adjustable wrench as claimed in Claim 1 wherein a leaf spring is clamped in the jaw which is fixed in relation to the head and engages a rack cut into the guide tongue, which tongue is thereby subjected to spring actions in opposed directions in dependence

upon the direction of displacement of the guide tongue from its normal position.

9. An adjustable wrench substantially as described with reference to any of the examples illustrated in the accompanying drawings.

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Fig. 1

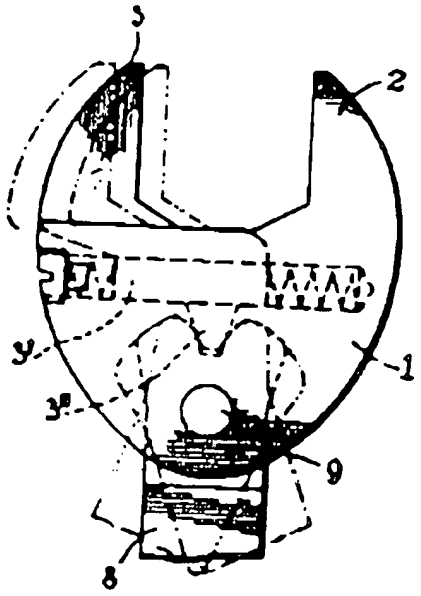

Fig. 2

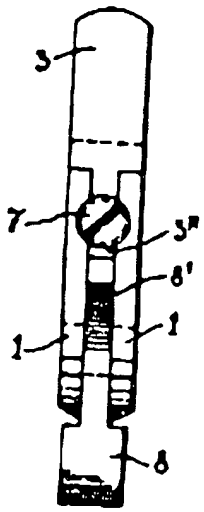

Fig. 3

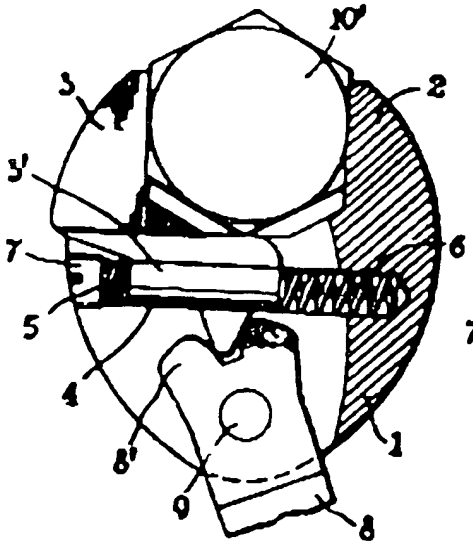

Fig. 4

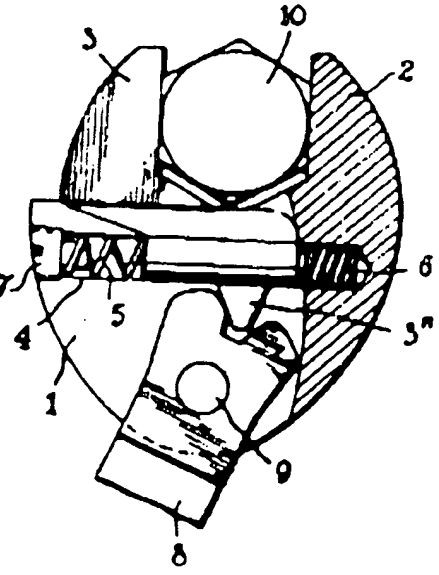

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Fig. 5

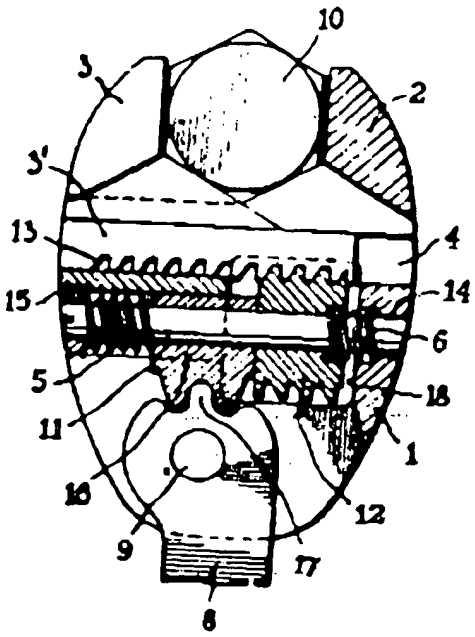


Fig. 6

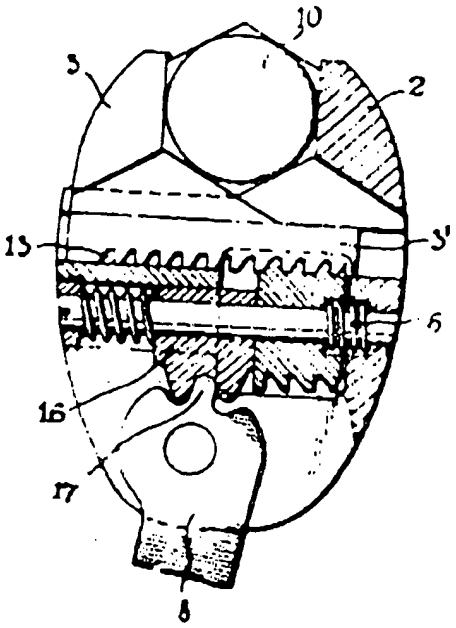


Fig. 7

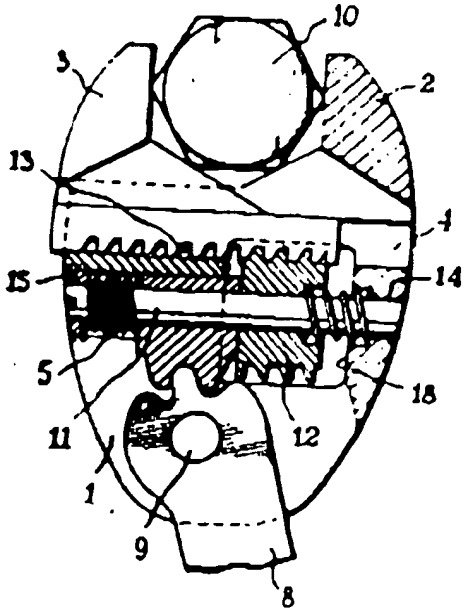


Fig.8

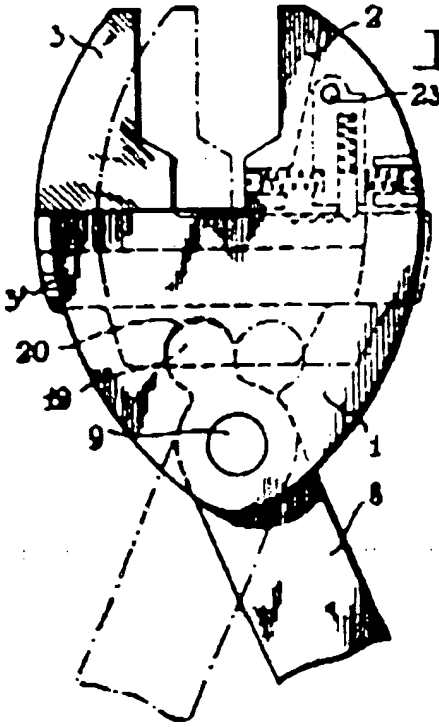


Fig.9

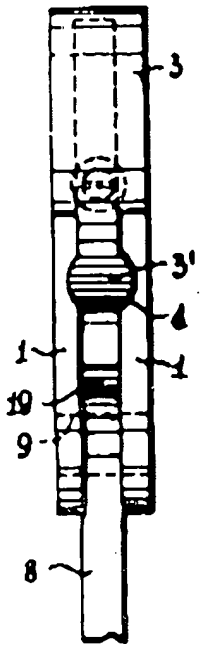
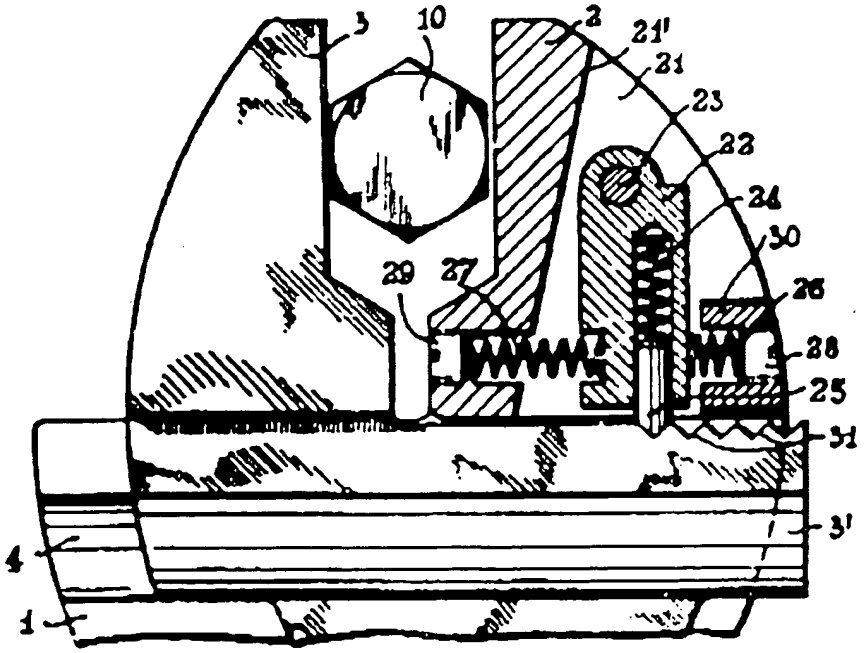


Fig. 10



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Sheets 3 & 4

Fig.11

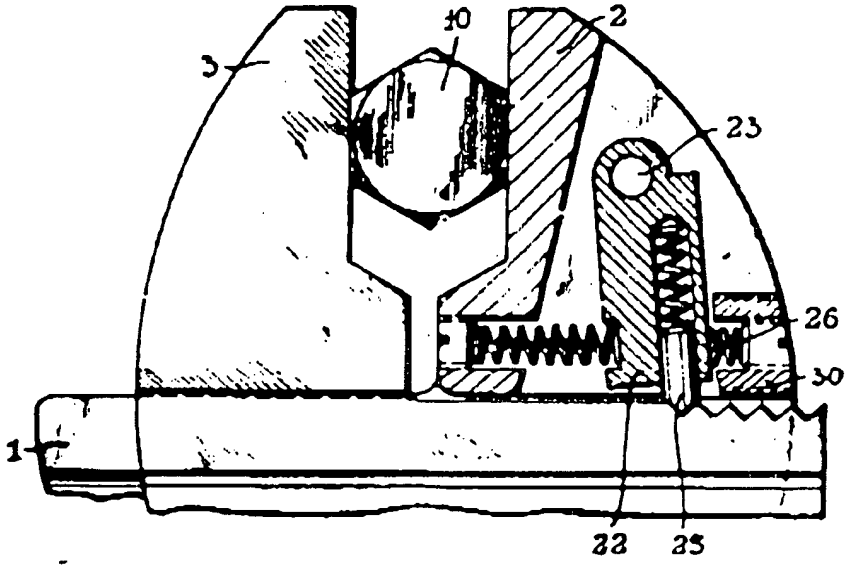

Fig.12

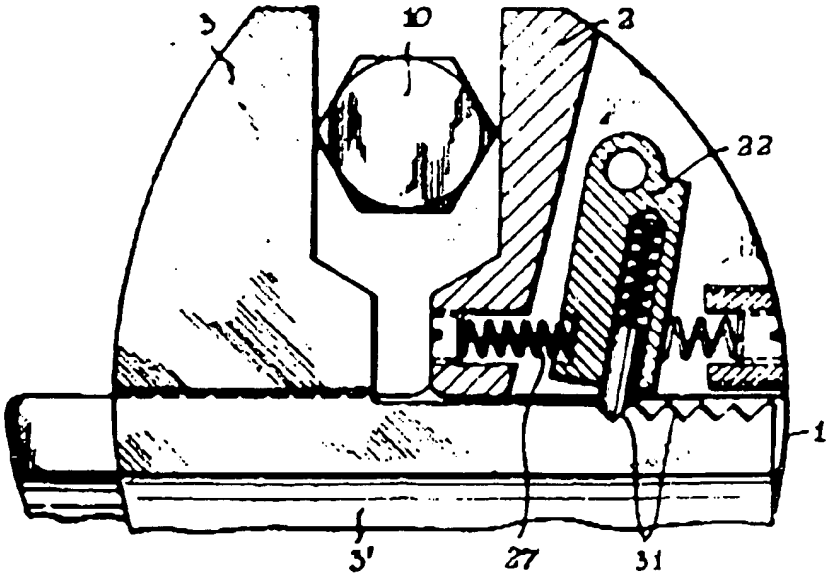

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Fig.13